

Application Serial No. 10/849,288
Reply to office action of July 25, 2005

PATENT
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Amendments To The Claims

The listing of claims presented below will replace all prior versions, and listings, of claims in the application.

Listing of claims:

1. (cancelled)
2. (currently amended) An The output driver as claimed in claim 1 for a semiconductor device, the output driver comprising:
a first pre-driver receiving a first signal so as to output a second signal in which a slew rate is controlled, wherein the first pre-driver comprises:
a CMOS inverter for receiving the first signal,
a pulse generating circuit for receiving the first signal to output a pulse signal having a constant width,
a first control section for receiving the pulse signal outputted from the pulse generating circuit, and
a second control section which is turned on and/or off by a control signal outputted from the first control section, and
wherein the second control section is positioned between a power supply voltage and an output end of the CMOS inverter,
wherein the second signal represents an output signal outputted through the output end of the CMOS inverter,
wherein the first and the second control section are

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sequentially enabled by the pulse signal generated from the pulse generating circuit, and

wherein the power supply voltage is supplied to the output end when the second control section is enabled.

a second pre-driver receiving a third signal so as to output a fourth signal in which a slew rate is controlled; and

a pull-up transistor and a pull-down transistor connected in series between a power supply voltage and a ground voltage,

wherein the pull-up transistor is turned on and/or off by the second signal, and the pull-down transistor is turned on and/or off by the fourth signal.

3. (original) The output driver as claimed in claim 2, wherein the second control section is enabled only while the pulse signal is enabled.
4. (original) The output driver as claimed in claim 2, wherein the first control section comprises at least one resistance component and at least one transistor connected in series between the power supply voltage and the ground voltage, and the transistor of the first control section is turned on to enable the second control section while the pulse signal is enabled.
5. (original) The output driver as claimed in claim 4, wherein the CMOS inverter is positioned between the power supply voltage and the ground voltage, and an NMOS transistor of the CMOS inverter has a PVT (process, voltage, and temperature) variation property similar to that of the transistor of the first control section.
6. (original) The output driver as claimed in claim 5, wherein the transistor of the

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first control section is an NMOS transistor and the second control section includes a PMOS transistor.

7. (currently amended) An The output driver as claimed in claim 4 for a semiconductor device, the output driver comprising:

a first pre-driver receiving a first signal so as to output a second signal in which a slew rate is controlled, wherein the first pre-driver comprises:

a CMOS inverter for receiving the first signal,
a first control section for receiving the first signal, and
a second control section which is turned on and/or off by a control signal outputted from the first control section, and

wherein the second control section is positioned between a power supply voltage and an output end of the CMOS inverter,

wherein the second signal represents an output signal outputted through the output end of the CMOS inverter,

wherein the first and the second control section are sequentially enabled when the first signal is enabled, and
wherein the power supply voltage is supplied to the output end when the second control section is enabled;

a second pre-driver receiving a third signal so as to output a fourth signal in which a slew rate is controlled; and
a pull-up transistor and a pull-down transistor connected in series between a power supply voltage and a ground voltage,

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wherein the pull-up transistor is turned on and/or off by the second signal, and the pull-down transistor is turned on and/or off by the fourth signal.

8. (original) The output driver as claimed in claim 7, wherein the first control section comprises at least one resistance component and at least one transistor connected in series between the power supply voltage and the ground voltage, and the transistor of the first control section is turned on to enable the second control section while the first signal is enabled.

9. (currently amended) An The output driver as claimed in claim 1 for a semiconductor device, the output driver comprising:

a first pre-driver receiving a first signal so as to output a second signal in which a slew rate is controlled;

a second pre-driver receiving a third signal so as to output a fourth signal in which a slew rate is controlled, wherein the second pre-driver comprises:

a CMOS inverter for receiving the third signal,

a pulse generating circuit for receiving the third signal to output a pulse signal having a constant width,

a first control section for receiving the pulse signal outputted from the pulse generating circuit, and

a second control section which is turned on and/or off by a control signal outputted from the first control section, and

wherein the second control section is positioned between an

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output end of the CMOS inverter and a ground voltage,
wherein the fourth signal represents an output signal
outputted through the output end of the CMOS inverter,
wherein the first and the second control section are
sequentially enabled by the pulse signal generated from the pulse
generating circuit, and
wherein the ground voltage is supplied to the output end
when the second control section is enabled;
a pull-up transistor and a pull-down transistor connected in series
between a power supply voltage and a ground voltage,
wherein the pull-up transistor is turned on and/or off by the second
signal, and the pull-down transistor is turned on and/or off by the fourth
signal.

10. (original) The output driver as claimed in claim 9, wherein the second control section is enabled only while the pulse signal is enabled.
11. (original) The output driver as claimed in claim 9, wherein the first control section comprises at least one resistance component and at least one transistor connected in series between the power supply voltage and the ground voltage, and the transistor of the first control section is turned on to enable the second control section while the pulse signal is enabled.
12. (original) The output driver as claimed in claim 11, wherein the CMOS inverter is positioned between the power supply voltage and the ground voltage, and a PMOS transistor of the CMOS inverter has a PVT variation property similar to that of the

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transistor of the first control section.

13. (original) The output driver as claimed in claim 12, wherein the transistor of the first control section is a PMOS transistor and the second control section includes an NMOS transistor.

14. (currently amended) An The output driver as claimed in claim 1 for a semiconductor device, the output driver comprising:

a first pre-driver receiving a first signal so as to output a second signal in which a slew rate is controlled;

a second pre-driver receiving a third signal so as to output a fourth signal in which a slew rate is controlled, wherein the second pre-driver comprises:

a CMOS inverter for receiving the third signal,

a first control section for receiving the third signal, and

a second control section which is turned on and/or off by a control signal outputted from the first control section, and

wherein the second control section is positioned between an output end of the CMOS inverter and a ground voltage,

wherein the fourth signal represents an output signal outputted through the output end of the CMOS inverter,

wherein the first and the second control section are sequentially enabled when the third signal is enabled, and

wherein the ground voltage is supplied to the output end when the second control section is enabled;

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a pull-up transistor and a pull-down transistor connected in series between a power supply voltage and a ground voltage,
wherein the pull-up transistor is turned on and/or off by the second signal, and the pull-down transistor is turned on and/or off by the fourth signal.

15. (original) The output driver as claimed in claim 14, wherein the first control section comprises at least one resistance component and at least one transistor connected in series between the power supply voltage and the ground voltage, and the transistor of the first control section is turned on to enable the second control section while the third signal is enabled.
16. (currently amended) The output driver as claimed in claim 2 ~~claim 4~~, wherein a first and a second resistance component are connected between the pull-up transistor and the pull-down transistor.
17. (new) The output driver as claimed in claim 7, wherein a first and a second resistance component are connected between the pull-up transistor and the pull-down transistor.
18. (new) The output driver as claimed in claim 9, wherein a first and a second resistance component are connected between the pull-up transistor and the pull-down transistor.
19. (new) The output driver as claimed in claim 14, wherein a first and a second resistance component are connected between the pull-up transistor and the pull-down transistor.